

Appl. No. 08/988,479  
Amdt. dated August 20, 2003  
Reply to Office Action of May 20, 2003

PATENT

REMARKS/ARGUMENTS

Claims 2-26 and 51-55 are pending in the present application. Claims 32-47 have been canceled. Claim 55 has been amended. No new claims have been added. Reconsideration of the present application is respectfully requested in light of the foregoing amendments and following remarks.

**I. Rejections Under 35 U.S.C. § 112**

Claims 2-26 and 51-55 have been rejected under 35 USC 112, second paragraph, as being indefinite for failing to point out and distinctly claim the subject matter which Applicant regards as the invention. In particular, In connection with claim 55 and all claims that depend therefrom, the Examiner alleges that the limitations "a non-imaging optical waveguide" and "said waveguide adapted to efficiently direct all the light" are unclear and vague. The Examiner has suggested that the Applicant include a "means for" clause; thereby incorporating the embodiments disclosed in the specification.

Applicant has amended claim 55 as set forth above, to include a "means for" clause as suggested by the Examiner. Applicant respectfully submits that amended independent claim 55 overcomes the section 112, paragraph two rejections. Furthermore, considering that the remaining claims add further limitations to and depend from amended independent claim 55, Applicant respectfully submits that the section 112, paragraph 2 rejections directed to these remaining claims are also overcome.

**II. Rejections Under 35 U.S.C. § 102**

The Examiner has rejected claims 2-26 and 51-55 under 35 USC 102(b) as allegedly being anticipated by U.S. Patent 4,898,450 to Jansson et al. (Jansson). The Examiner has stated that if the Applicant adds structural limitations to more specifically describe the invention as disclosed in the specification, the Jansson reference will not apply.

Applicant points out that independent claim 55 has been amended as set forth above, to more specifically describe the invention as disclosed in the specification and also agree

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with the Examiner in that the Jansson reference does not apply. In addition Applicant respectfully submits that Jansson does not teach all the elements of amended independent claim 55, for reasons set forth below.

The Jansson Reference

The Jansson invention is directed towards a fiber optic connector. For example, the Jansson abstract recites starting with "there is disclosed an expanded beam fiber to fiber connector..." The abstract recites further that "the system consists of two identical connector parts." Additionally, the abstract also recites that "...a lens may be located..." at the connection between the two connectors. The Jansson patent is directed towards a fiber optic beam to beam connector. For example, see col. 3 lines 8-14, where the Jansson patent states that "the non-imaging connector which is the subject matter of the present invention has a higher tolerance to angular misalignment than prior art systems based on imaging optics." Also, see col. 7, lines 14-16, again referring to an example of the connector of the present invention. The Jansson invention deals with developing the contours of the side walls and front and exit surfaces for connectors, which are two identical parts (see col. 3, lines 55-56). The Jansson patent is related to methods for having back-to-back connectors for connecting poorly aligned optical fibers that have a higher tolerance to angular misalignment than prior art systems based on imaging optics.

The Cited Art Distinguished

The Jansson reference does not teach non-imaging devices for bending light from fiber optic cables around a bend in an efficient and compact manner. In stark contrast, the presently claimed invention teaches a suite of non-imaging devices for the efficient and compact turning of light around a corner from one optical fiber to another.

Turning now to the portions of the Jansson reference relied upon by the Examiner as a basis for his 35 U.S.C. 102(b) rejections, Applicant respectfully submits that the Jansson reference does not teach efficient non-imaging optical corner turning. The Examiner has relied on the language describing the arrangement of Fig. 11 of the Jansson reference. The Jansson patent clearly calls the device of Fig. 11 a four port directional coupler (see col. 7, lines 29-30).

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The entire disclosure that could be presumed to relate to the corner turning teachings is contained in one sentence where the Jannson patent recites "input beams can be split into output beams by means of a suitable half-mirror..." (see col. 7, lines 31-32). Nowhere else does the Jannson patent provide any teachings related to any device other than a "connector" which is the subject matter of the Jannson patent. Applicant respectfully submits that the phrase "suitable half-mirror" is unclear and undefined; what is suitable? and how is a half-mirror an optically efficient non-imaging device?

The mere presence of the sentence citing a "a suitable mirror" is a testament to the lack of teachings related to such a device. First, a mirror is an imaging device, and hence not a non-imaging device. Second, a statement directed to a suitable mirror begs the question of "what is a suitable mirror that would work efficiently and in a compact manner?" The Jannson patent does not teach what a suitable mirror is, and/or how one would go about making such a device. Furthermore, a half-mirror besides being an imaging device, is also inherently non-efficient. A half mirror is inefficient because it transmits half and reflects half of the energy that is incident upon it. By reflecting half the incident energy, a half-mirror loses  $\frac{1}{2}$  of the incident energy and thus is grossly inefficient. The device shown in Fig. 11 of the Jannson reference, reflects light via an imaging-type half-mirror around a corner in an imaging manner, not in a non-imaging manner. The Jannson device deflects  $\frac{1}{2}$  of its incident light, which is an inefficient redirection of optical energy, not an efficient redirection of optical energy.

However, the presently claimed invention is directed towards a non-imaging devices for the efficient and compact turning of light around a bend. Besides clearly distinguishing the present claimed invention (i.e., an efficient non-imaging optical corner turner) from the cited art (i.e., an optical connector) as set forth above, the Applicant presents two additional arguments for interpreting the teachings of Jannson and further distinguishing the claimed invention from this cited art. These interpretations are that: (1) the cited art device is not optically efficient, and (2) the cited art device uses imaging devices, and hence is not a purely non-imaging device.

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Turning to the first argument, Applicant submits that a visual inspection of Fig. 1 of the Jannson reference shows that upon exit from the collimator, light rays may exit with a divergence angle of  $\theta_2$ . Light rays exiting the collimator at any  $\theta_2$  greater than zero have the possibility of missing their target surface, which could be a mirror image of Fig. 1, for example as shown in Fig. 4 (of Jannson). Since light rays could miss the target surface, the arrangement of Fig. 1 (of Jannson) is not optically efficient. Jannson's lack of optical efficiency clearly distinguishes the present claimed invention from the Jannson reference.

Turning now to the second argument, Applicant submits that the Jannson device uses imaging elements to address the potential inherent inefficiencies of its connector. The arrangement for a connector shown in Fig. 2 of Jannson shows a "lens-type front surface" to increase the overall optical efficiency of its system. The lens is used to focus the light rays onto the receiving surface. Here, Jannson is using imaging optical devices such as a lens to increase the efficiency of its in-line beam-to-beam connector. However, the present claimed invention, which is based on non-imaging optics, achieves efficient corner turning without resorting to the use of lens-type imaging devices. The absence of a imaging devices (e.g. a lens) in the present claimed invention further distinguishes it from the Jannson reference.

In conclusion, Applicant respectfully submits that the Jannson reference does not anticipate new claim 55. Furthermore, considering that claims 2-26 include all of the features of independent claim 55, from which they depend, these claims are patentable to the same extent that new independent claim 55 is patentable.

**CONCLUSION**

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is urged.

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If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,



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